



A.D. 1854 . . . . . N° 2612.

# SPECIFICATION

OF

GEORGE HENRY BACHHOFFNER.

FIRE-PLACES.

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1855.





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A.D. 1854 . . . . . N° 2612.

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**Fire-places.**

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**LETTERS PATENT** to George Henry Bachhoffner, of Upper Montagu Street, in the County of Middlesex, for the Invention of “**IMPROVEMENTS IN THE CONSTRUCTION OF FIRE-PLACES, FOR THE BETTER CONSUMPTION OF SMOKE, AND IN LIGHTING AND MAINTAINING FIRES.**”

Sealed the 8th June 1855, and dated the 12th December 1854.

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**PROVISIONAL SPECIFICATION** left by the said George Henry Bachhoffner at the Office of the Commissioners of Patents, with his Petition, on the 12th December 1854.

I, GEORGE HENRY BACHHOFFNER, of Upper Montagu Street, in the County  
5 of Middlesex, do hereby declare the nature of the said Invention for “**IMPROVEMENTS IN THE CONSTRUCTION OF FIRE-PLACES, FOR THE BETTER CONSUMPTION OF SMOKE, AND IN LIGHTING AND MAINTAINING FIRES,**” to be as follows:—

I place within and above the ordinary fire-grate a moveable diaphragm, furnished with bars, in shape and character like an ordinary false grate or bottom,  
10 which, by rack motion or other means, can be raised up and down, and sustained at any point; upon this I place coke, charcoal, or any other non-fuliginous fuel, while in the ordinary grate is placed the coal or fuliginous fuel. To light the fire I employ an apparatus which I call a gas poker; this poker consists of a hollow tube of iron, shaped like a common poker, the lower end being per-  
15 forated with holes; the upper end is furnished with a union, by which the iron tube or poker can, by a piece of flexible tube, be attached to a gas pipe, coming up in the usual way at the side of the stove or fire-place. This gas poker is thrust into the coals in the lower part of the grate, the gas turned on and



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*Bachhoffner's Improvements in the Construction of Fire-places, &c.*

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ignited, by which the coal is brought into rapid combustion, the heat from which, passing through the bars of the diaphragm above, ignites the coke or charcoal above; the two fires are then to be maintained by putting, as occasion requires, coke on the upper fire and coal on the lower one; the effect of which is, that smoke rising from the lower coal fire is consumed in passing through 5 the ignited coke or charcoal.

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**SPECIFICATION** in pursuance of the conditions of the Letters Patent, filed by the said George Henry Bachhoffner in the Great Seal Patent Office on the 12th June 1855.

**TO ALL TO WHOM THESE PRESENTS SHALL COME, I, GEORGE 10**  
**HENRY BACHHOFFNER**, of Upper Montague Street, in the County of Middlesex, send greeting.

**WHEREAS** Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Twelfth day of December, in the year of our Lord One thousand eight hundred and fifty-four, in the eighteenth year of Her 15 reign, did, for Herself, Her heirs and successors, give and grant unto me, the said George Henry Bachhoffner, Her special licence that I, the said George Henry Bachhoffner, my executors, administrators, and assigns, or such others as I, the said George Henry Bachhoffner, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and 20 at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for “**IMPROVEMENTS IN THE CONSTRUCTION OF FIRE-PLACES, FOR THE BETTER CONSUMPTION OF SMOKE, AND IN LIGHTING AND MAINTAINING FIRES,**” upon the condition 25 (amongst others) that I, the said George Henry Bachhoffner, by an instrument in writing under my hand and seal, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the 30 said Letters Patent.

**NOW KNOW YE**, that I, the said George Henry Bachhoffner, do hereby declare the nature of my said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement, reference being had to the Sheet of Drawings hereunto 35 annexed, and to the letters and figures marked thereon (that is to say):—



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*Bachhoffner's Improvements in the Construction of Fire-places, &c.*

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The first part of my Invention relates to the construction of fire-places or grates, wherein to maintain a fire or fires in such state or states as will produce a better consumption of the smoke evolved during combustion than is effected in the ordinary fire-places ; for this purpose, I place within  
5 and above the ordinary fire-grate a moveable diaphragm, furnished with bars, in shape and character like an ordinary false grate or bottom, which, by rack motion or other means, may be raised up and down and sustained at any point ; upon this I place anthracite coal, coke, charcoal, or other non-bituminous fuel. This fire may be lighted in the ordinary way, or by means of  
10 what I denominate a gas poker, also of my Invention ; the fire being lighted in the lower grate with coals or other bituminous fuel. I then bring the upper grate close down upon the ignited coals in the lower grate, the anthracite, coke, &c. will then become ignited, and remain in an incandescent state, so that the smoke from the lower fire will be consumed as it  
15 passes through the incandescent mass above. When fresh coal is to be put on the lower fire, the upper one is raised for the purpose, and again lowered to the proper position. In adding fuel to the upper or smokless fire, it is better that the two grates should not be charged at the same time. Instead of using two separate kinds of fuel, the coals in the lower grate, when suffi-  
20 ciently coked, may be lifted up with a shovel into the upper grate, and fresh coals added below. Instead of using two permanent grates or places to hold fuel, I arrange and construct the stove or fire-place as herein-after described, so that the upper grate is used more as a temporary enclosure for the fuel during the supply of fresh coals, whereby the incandescent mass in the lower grate is  
25 raised into the upper part, and held there while coaling takes place ; when the fresh fuel is supplied, the apparatus is so arranged that the incandescent mass is then laid on the fresh coals. Any smoke or gas evolved from the fresh coal has to pass through as before.

The second part of my Invention, which relates to the gas poker, consists of  
30 a hollow tube of iron or other metal, shaped like a common poker, the lower end being perforated with holes ; the upper end is furnished with a union, by which the iron tube or poker can, by a piece of flexible tube, be attached to a gas pipe, coming up in the usual way at the side of the stove or fire-place. This gas poker is thrust into the fuel in the lower part of the grate, the gas turned  
35 on and ignited, by which the fuel is brought into rapid combustion, and when fully ignited the gas poker is withdrawn.

Fig. 1 of the Sheet of Drawings annexed represents a front elevation of a stove or fire-place arranged and constructed according to my Invention ; Fig. 2, a back view ; and Fig. 3, an end elevation of the same. *a, a*, is the



*Bachhoffner's Improvements in the Construction of Fire-places, &c.*

ordinary fixed grate, which in this stove is of less height than ordinary, but in other respects is very similar; *b, b*, is the supplementary grate, in which the anthracite, coke, or other fuel, or half-burnt coal, is to be placed. The grate *b, b*, is not fixed in the position shown, being attached to two metal plates *c, c*, at the back of the stove, better seen in Fig. 3; openings *d, d*, are formed at the back of the stove for the fastenings of the grate *b, b*, to pass. The openings *d, d*, are of sufficient length to permit the required rise and fall of the grate *b, b*, and for which they act as guides; these openings are always covered by plates *c, c*, which are long enough for that purpose. The plates *c, c*, are suspended by two rods *e, e*, from arms *f, f*, fixed on a rocking shaft *g*, mounted in bearings *h, h*, on the top of the stove, by which means the grate *b, b*, is raised and lowered, and fixed at the height required. To actuate this gearing, I mount a segment of a screw wheel *i* on the end of shaft *g*, by which rotary motion is transmitted to that shaft; this motion is communicated by the endless screw *k*, which geers into screw wheel *i*. The endless screw *k* is mounted on the shaft *l*, to which motion is given by a winch handle, seen dotted in Fig. 3. By this means the grate may be elevated or depressed, or will remain stationary in any position. As before mentioned, the coal is placed in the lower grate *a, a*, and ignited by the use of the gas poker or otherwise. Anthracite, coke, &c. is then placed in the upper grate *b*, which is brought down in sufficient proximity to the coal, by which it will be ignited, and maintain an incandescent state. In supplying fresh coal from time to time the grate *b* has simply to be raised, as described, and fresh coals thrown on; anthracite or coke may also be thrown on the upper grate, as occasion requires, after which it is again lowered to position.

Instead of using anthracite or coke, the half-burned fuel may be removed by a shovel from the grate *a* into grate *b*, in an incandescent state, and thereby supplying the place of the coke, and will consume the smoke evolved by the fresh coals, and prevent its passing off into the chimney. The grate *b*, it will be observed, is made somewhat smaller than the lower grate *a, a*, so that it may descend within that grate, and be brought in close contact with the fresh coals, if desired. Instead of a separate grate *b* with front bars, that may consist simply of a grating or bars forming a false bottom, to be raised and lowered as described, but in which case I carry the front bars of grate *a, a*, much higher, taking care to raise the upper grate on when the supply of fuel is rather deficient thereon, and to feed with anthracite or coke when it is lowered within the bars *a, a*.

Fig. 4 represents a front elevation of a stove adapted for the more ready and convenient transfer of the fuel in the lower grate to the upper



FIG. 1.

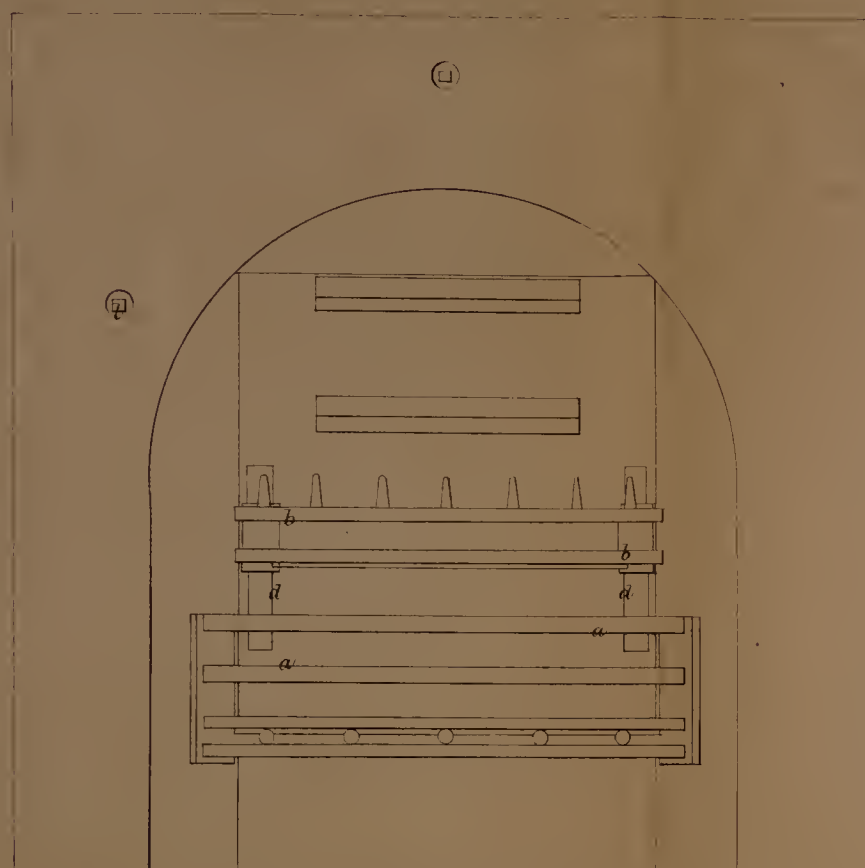


FIG.

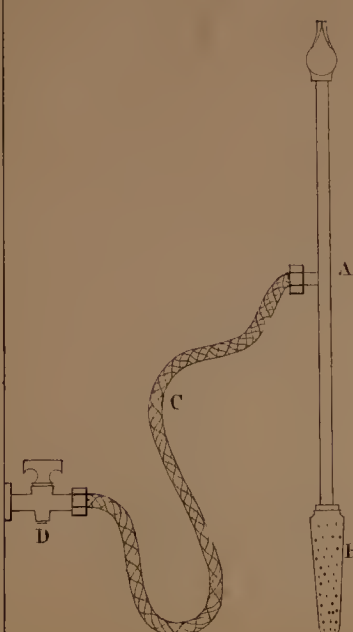


FIG.

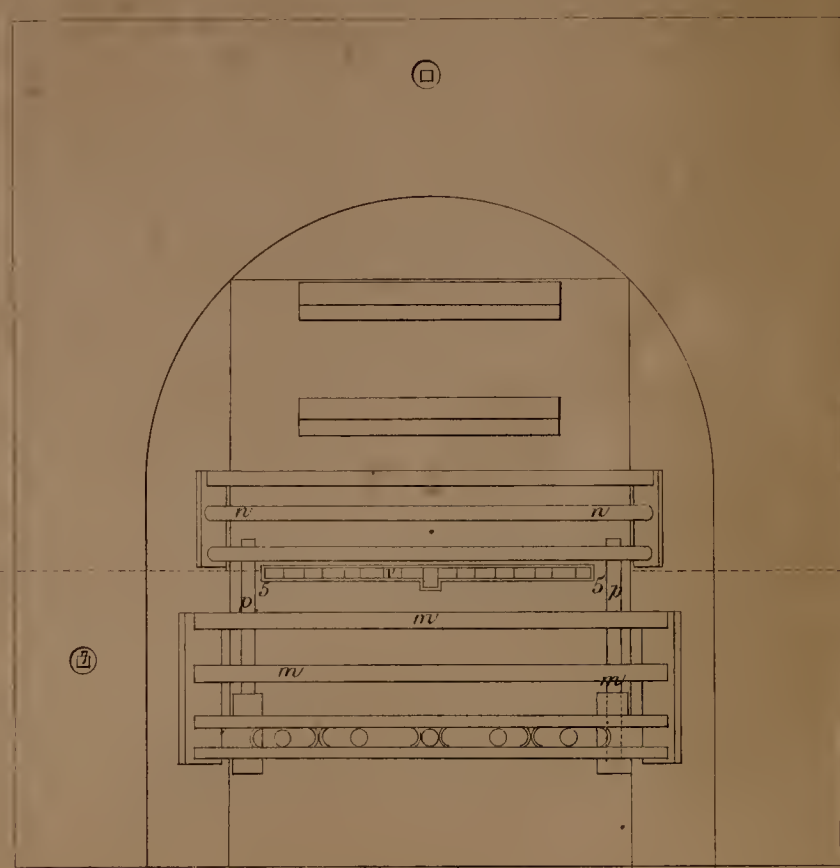


FIG. 6.

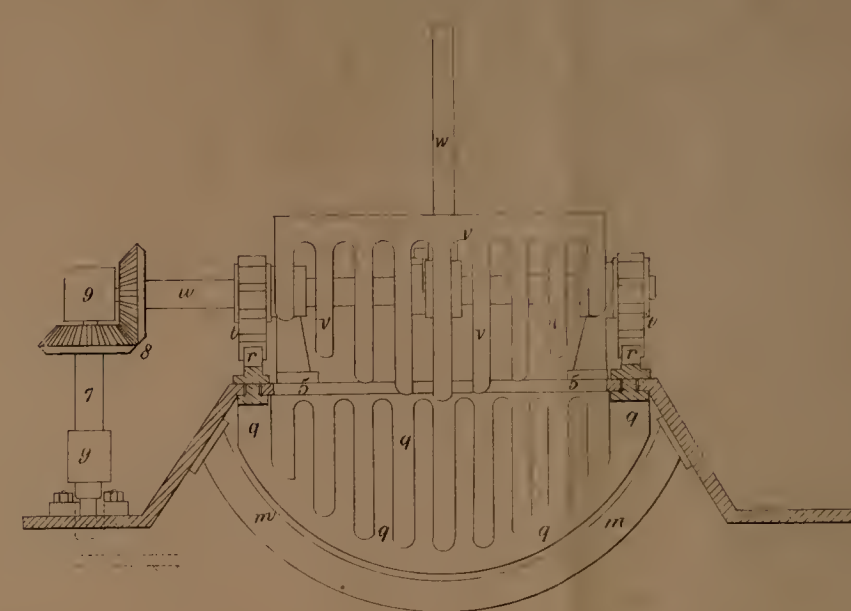


FIG. 2.

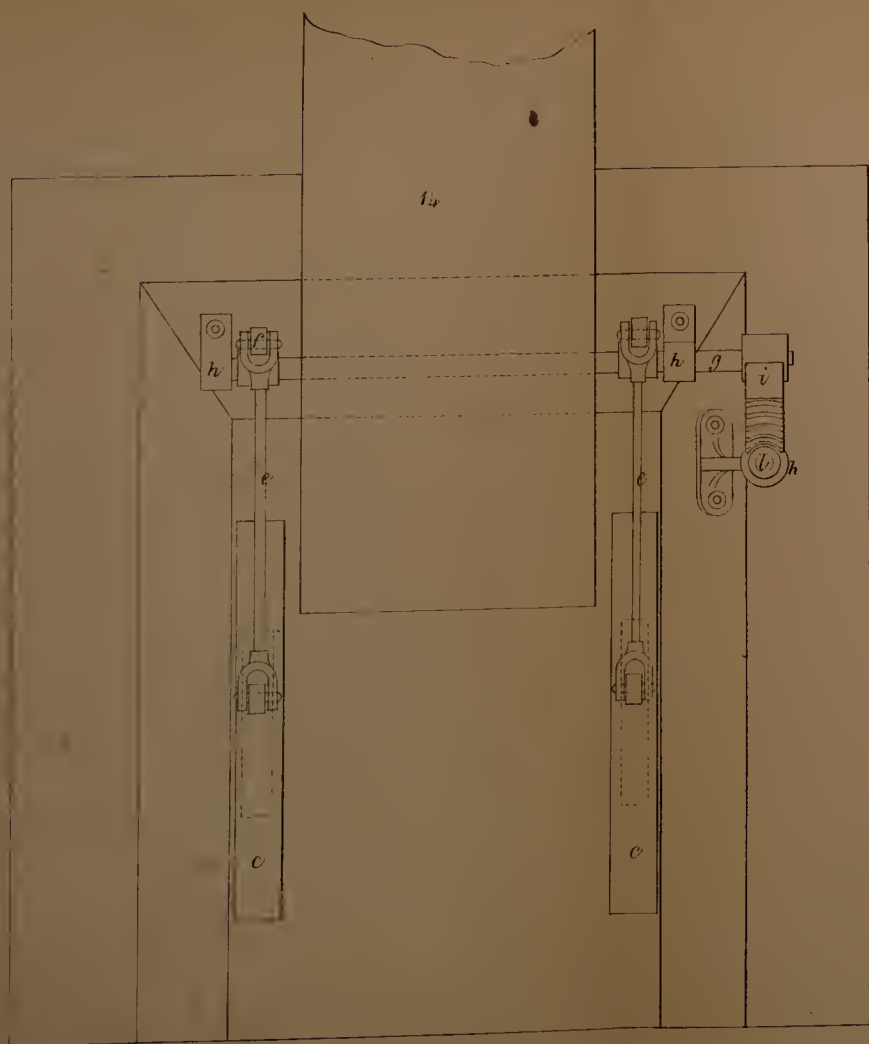


FIG. 3.

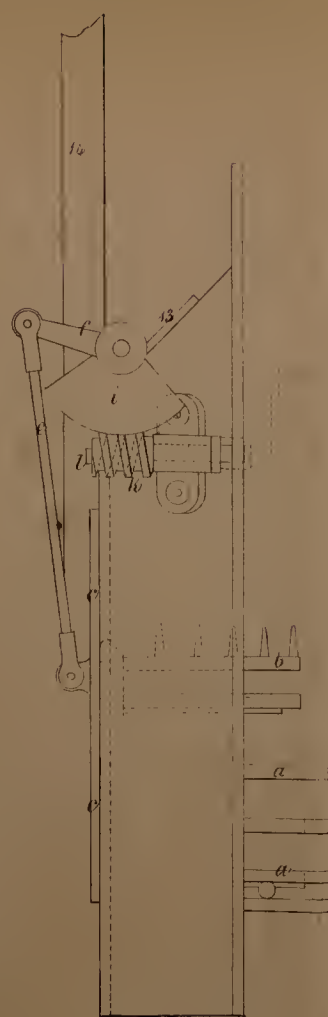


FIG. 5.

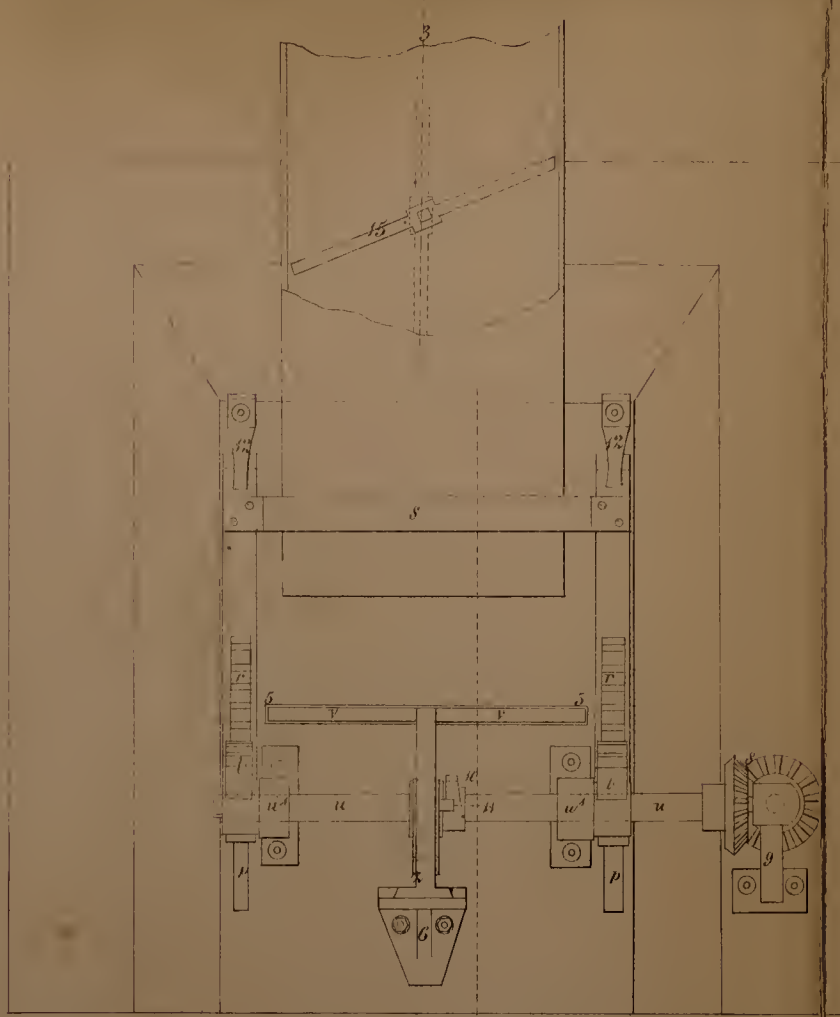


FIG.

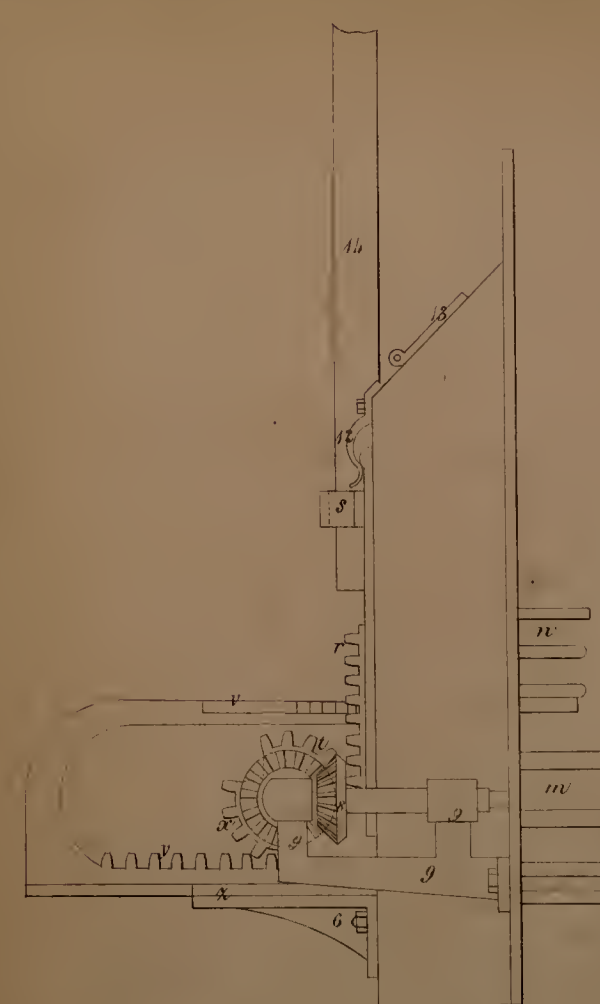
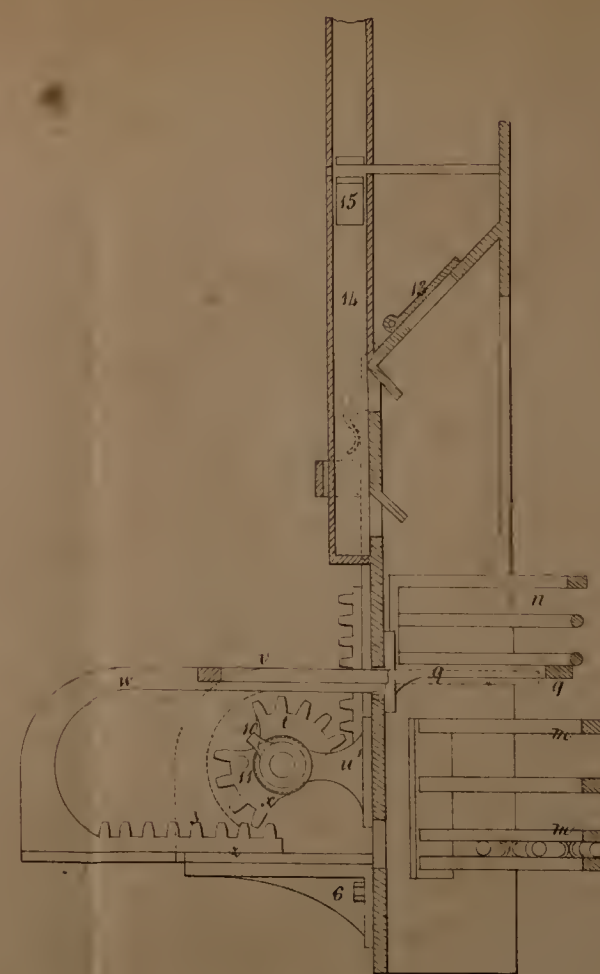
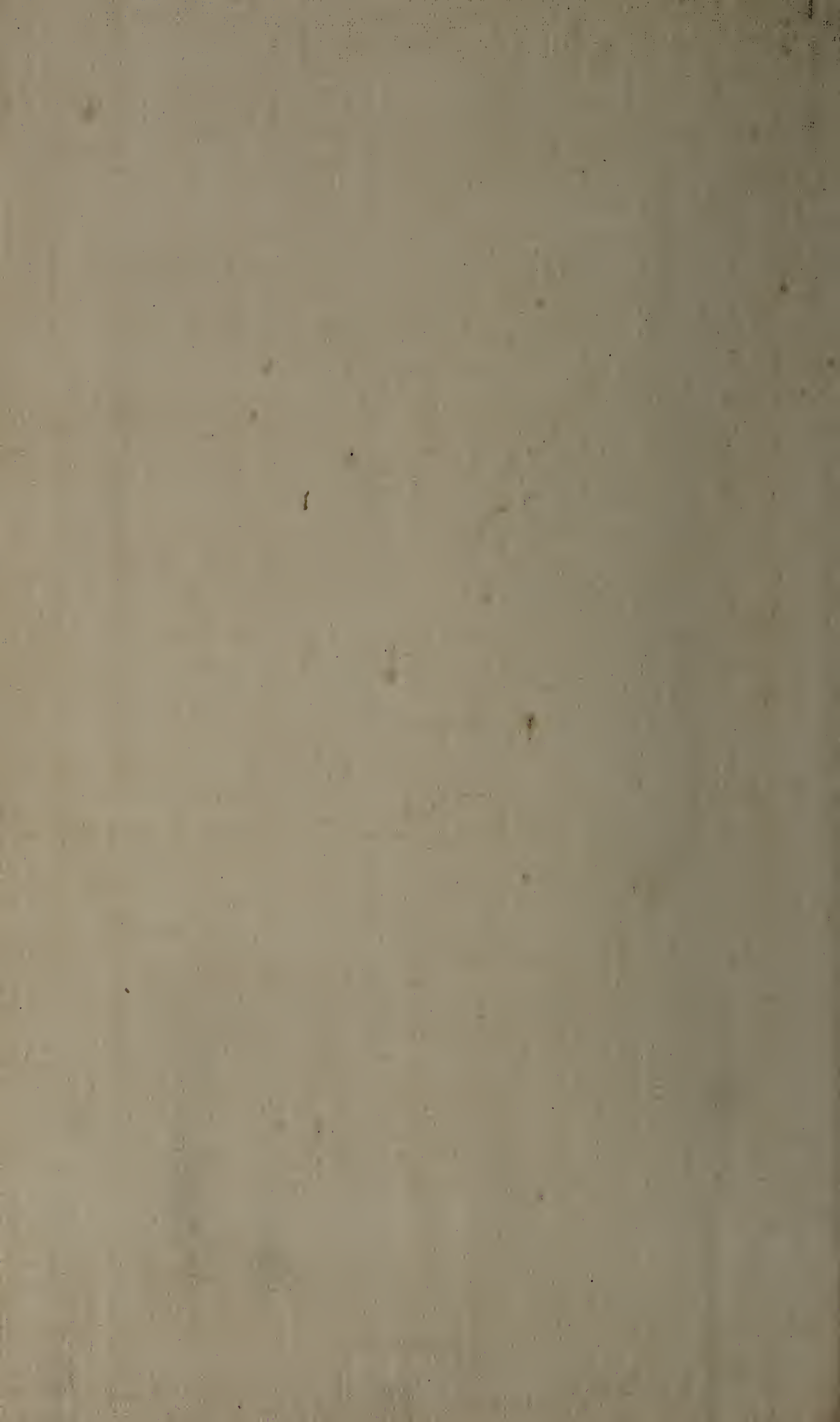


FIG.







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*Bachhoffner's Improvements in the Construction of Fire-places, &c.*

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one; Fig. 5, a back view of the same; Fig. 6, a horizontal section on the line 1, 2; Fig. 7, an end elevation; and Fig. 8, a transverse vertical section through line 3, 4. In this stove there are two sets of front bars *m* and *n*, as before, but the grated bottoms, instead of being fixed as in Fig. 1, are both moveable, as will appear in the description; the two sets of front bars, however, are both fixed; vertical slots *p, p*, are cut through the back of the stove, as before, through which the grated bottom *q* of lower fire-place is attached to rack plates *r, r*, by which the bottom *q, q*, is suspended; the slots *p, p*, guiding the racks in their movement, which are further connected by a tie bar *s*. The racks *r, r*, are raised and lowered by means of segments of toothed wheels *t, t*, mounted on the shaft *u*, which has rotary motion communicated to it, as will be described. The grated bottom *v, v*, of the upper set of bars is also moveable, but in a horizontal direction, and slides too and fro from behind; it is sustained in a slot 5, 5, cut across and through the back part of the stove, and further supported by an arm *w*, through which its traverse is communicated from the wheel segment *x*, which geers with the rack *y*, fixed to the arm *w*. The rack *x* and arm *w* moves in and is sustained in a dovetailed slide *z* on bracket 6; shaft *u* is mounted in bearings *u<sup>1</sup>, u<sup>1</sup>*, connected by bevil gear 8, 8, with shaft 7, mounted in bracket bearings 9, 9, and driven by a winch handle placed thereon, as before.

Figs. 5, 6, 7, and 8 represent the different parts in position with the lower grating or bottom *q* just raised, at which point the toothed segments *t, t*, leaves the racks when another movement takes place. The toothed segments *t, t*, are fixed upon the shaft *u*, while the toothed segment *x* is loose, motion being communicated to it at proper times by an arm 10, fixed to the shaft *u*, coming in contact with a pin 11, projecting from the side of toothed segment *x*, and in the following order:—

Supposing a fresh supply of fuel to be required on the fire, the winch handle is turned to the left, which raises the racks, and with them the bottom grate *q*, which brings up all the fire in fire-place *m* into upper fire-place *n*. Two springs, 12, 12, here catch the tops of rack plates *r, r*, and sustain them. (Instead of spring catches 12, 12, counterpoise weights may be employed.) When the segments *t, t*, have left them, the further motion of shaft *u* now brings round arm 10 in contact with pin 11, when segment *x* begins to move rack *y*, and with it arm *w*, and grated bottom *v*, which comes forward and slides between the bars of *q* at a little lower elevation.

When the bars *v* have performed the forward movement, the motion of the winch handle is reversed, which first brings down the racks *r, r*, and grated bottom *q*, leaving the incandescent fuel before occupying the lower fire-place



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in the upper one. When this bottom *q* has reached the lowest point, the fresh coal is to be introduced into the lower fire-place between the upper and lower sets of bars *m*, *n*, which being completed, the motion of the winch handle is again to be continued in the same direction (to the right), which brings round arm 10 in contact with the other side of pin 11, and so as to drive the segment 5 *x* in the opposite direction, which withdraws the grate bars *v* from the forward position, shown dotted in Fig. 8, when the incandescent mass falls on the fresh coals, which are thereby ignited and burn downwards, the smoke and gases evolved being consumed in passing through the bright fire above. To render the coaling more convenient, the lower grate and front bars may all rise and 10 fall together, but must pass within the upper set of front bars; by which arrangement, when lowered, the bottom fire-place may be brought so low as to render it more convenient for throwing on the coal.

In this case I prefer to use the endless screw geer first described for raising and lowering the bars, and a separate lever motion for imparting the too and 15 fro movement to bars *v*; or it may be a separate wheel, as described with reference to the latter Figures. In addition to ordinary trap 13 I use a flue 14, in which I place a damper 15, which I open or close, according to the draft I wish to produce through the fire.

Fig. 9 is a representation of the gas poker, which I construct with a tubular 20 shaft or handle *A*, having an enlarged hollow termination *B*, formed with numerous perforations, at which the gas issues when it is thrust into the fire. This part *B* should be of considerable thickness of metal to allow for wear, or constructed of metal on which gas or fire will not act prejudicially. The shaft *A* is connected by means of flexible pipe *C*, and unions, to a main 25 pipe at the side of the stove, or in other convenient position, furnished with a stop-cock *D*, by which the gas is turned on and off as required.

In witness whereof, I, the said George Henry Bachhoffner, have here-  
unto set my hand and seal, this Twelfth day of June, in the year of our  
Lord One thousand eight hundred and fifty-five.

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GEO. H. BACHHOFFNER. (L.S.)

LONDON:

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